

CLAIMS

What is claimed is:

1. A data storage system comprising:

a first non-volatile storage device;

a second non-volatile storage device having a slower average access time and a higher capacity than the first storage device, wherein the slower average access time is the average delay that is necessary before the second non-volatile storage device can begin to write data; and

a storage controller operable to direct a first portion of data to the first storage device and a second portion of data to the second storage device.
2. The data storage system of claim 1, wherein the storage controller is operable to direct the second device to reserve space sufficient to accommodate the first portion of data.
3. The data storage system of claim 2, wherein the storage controller is operable to direct the first storage device to send the first portion of the data to the reserved space in the second storage device.
4. The data storage system of claim 1, wherein the first non-volatile storage device conducts operations that are not directly related to the storage of data when the storage controller is directing the second portion of data to the second storage device.

5. The data storage system of claim 4, wherein operations that are not directly related to the storage of data include garbage collection.

6. The data storage system of claim 1, wherein the second storage device begins to experience its delay before the entire first portion of the data is directed to the first storage device.

7. The data storage system of claim 1, wherein the first storage device stores data in a ring buffer arrangement of physical addresses.

8. The data storage system of claim 1, wherein the first storage device stores data in a cyclic buffer arrangement of logical addresses.

9. The data storage system of claim 1, wherein the storage controller is additionally operable to retrieve a first portion of data from the first storage device and a second portion of data from the second storage device.

10. The data storage system of claim 1, wherein:

the first non-volatile storage device is a solid-state memory; and

the second non-volatile storage device is a magnetic hard disk.

11. The data storage system of claim 10, wherein the solid-state memory is a flash memory system.

12. A data storage system comprising:

a first non-volatile storage device;

a second non-volatile storage device having a slower average access time and a higher capacity than the first storage device, wherein the slower average access time is the average delay that is necessary before the second non-volatile storage device can begin to read data; and

a storage controller operable to retrieve a first portion of data from the first storage device and a second portion of data from the second storage device.

13. A data storage system comprising:

a first storage device that is operable to store head data, the head data being a first portion of data in a contiguous data stream;

a second storage device having a slower average access time and a higher capacity than the first storage device, the second storage device being operable to store body data, the body data being a remaining portion of data in a contiguous data stream;

a head table that is operable to contain information relating to the location of the head data and the location of the body data; and

a storage controller operable to satisfy data storage requests by using the head table.

14. A method for storing data comprising:

receiving a write command from a host system bus to write to a data address;

receiving a data fragment from the host system bus;

storing a first portion of the data fragment in a first storage device;

causing, prior to the completion of storing the first portion of the data fragment in the first storage device, a second storage device to be prepared to write data; and

storing a remaining portion of the data fragment in the second storage device after the second storage device has been prepared.

15. The method for storing data of claim 15, further comprising updating a head table that contains information relating to the location of the first portion of data and the remaining portion of data.

16. The method for storing data of claim 14, wherein causing the second storage device to be prepared to write data includes sending a seek command to a second address that is equal to the data address and an offset that is large enough to store the first portion of the data fragment.

17. The method for storing data of claim 16, further comprising subsequently copying the first portion of the data fragment from the first storage device to the data address in the second storage device.

18. The method for storing data of claim 17, wherein the copying is performed during when the host system bus is not requesting access to the data contained in either the first or second storage device.

19. The method for storing data of claim 14, wherein the entire data fragment is stored exclusively in the second storage device if the first storage device is not available.

20. A method for retrieving data comprising:

receiving a read command from a host system bus to read data at a data address;

determining if a first portion of the data resides on a first storage device;

if the first portion of data resides on the first storage device, then

reading the first portion of the data from the first storage device;

causing, prior to the completion of reading the first portion of the data fragment in the first storage device, a second storage device to be prepared to read a remaining portion of the data; and

reading the remaining portion of data from the second storage device after the second storage device has been prepared to read the remaining portion of the data; and

if the first portion of data does not reside on the first storage device, then reading both the first portion of the data and the remaining portion of the data from the second storage device.

21. The method for retrieving data of claim 20, further comprising copying the first portion of data from the second storage device to the first storage device if it was determined that the first portion of data did not reside on the first device.

22. The method for retrieving data of claim 20, further comprising setting a flag in a head map table that indicates that the data was requested.

23. The method for retrieving data of claim 20, wherein both the first portion of data and the remaining portion of data are read from the second storage device if the first storage device is not available.

24. A computer-readable medium including at least computer program code for storing data, the computer-readable medium comprising:

computer program code for receiving a write command from a host system bus to write to a data address;

computer program code for receiving a data fragment from the host system bus;

computer program code for storing a first portion of the data fragment in a first storage device;

computer program code for causing a second storage device to be prepared to write data prior to the completion of storing the first portion of the data fragment in the first storage device; and

computer program code for storing a remaining portion of the data fragment in the second storage device after the second storage device has been prepared.